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| 10/036,536 | 01/07/2002 | Hans-Jochen Paul | Q67852 | 4860 |

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| EXAMINER |
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PRITCHETT, JOSHUA L

| ART UNIT | PAPER NUMBER |
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2872

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/036,536

Applicant(s)

PAUL ET AL.

Examiner

Joshua L Pritchett

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pw

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-51 is/are rejected.
- 7) ☒ Claim(s) 26,28-30,42 and 44-46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7,9 6) ☐ Other: _____

DETAILED ACTION

This action is in response to Amendment A filed August 1, 2003. Claims 1-16 have been cancelled and claims 17-51 have been added as requested by the applicant.

Claim Objections

Claims 26, 28-30, 42 and 44-46 are objected to because of the following informalities: the claim language renders the claim indefinite. It is not clear in any of the above claims which of the claimed values the optical filter is supposed to meet. For example, in claim 26 it is not clear if the thickness is to be less than λ or 0.5λ . The other claims objected to have similar indefinite issues with the claim language. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 17-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otani (US 5,885,712) in view of Hashimoto (US 5,532,871).

Regarding claims 17, 36-39 and 50, Otani teaches an optical component comprising a substrate with at least one surface; a multilayer system of at least six stacked layers arranged to the at least one surface of the substrate, each of the layers comprising a high refractive or a low refractive dielectric material (Fig. 1). Otani further teaches the use of only one high and one low refractive material (col. 2 lines 45-48). Otani further teaches the high refractive index material being aluminum oxide (col. 2 lines 45-46). Otani further teaches the use of a layer with an optical thickness equal to or less than 0.33λ (col. 2 lines 26-34). Otani further teaches that none of the layers has a geometrical thickness of more than about 0.5λ (col. 2 lines 26-34). Otani lacks reference to the second layer having a thickness of less than 0.33λ . It is extremely well known in the art that one may change the ordering of the low refractive layers in a high-low alternating refractive index optical filter without altering the functionality of the optical filter. Therefore one of ordinary skill in the art would recognize that the second layer of Otani could have the optical thickness of any of the low refractive layers without altering the function of the optical filter. One would have been motivated to decrease the optical thickness of the second layer for the purpose of increasing the amount of light transmitted by the filter by limiting the amount of material the light must pass through within the filter. Otani further lacks reference to the use of magnesium fluoride as the low refractive index material. Hashimoto teaches that silicon dioxide, which is used in Otani as the low refractive material, and magnesium fluoride both are commonly known and used low refractive materials and that magnesium fluoride can be used in place of silicon dioxide (abstract lines 5-7). It would have been obvious to a person of

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ordinary skill in the art at the time the invention was made to have the Otani filter use magnesium fluoride as taught by Hashimoto for the purpose of reducing the optical thickness of the low refractive layers without incurring the cost of making physically thinner layers.

Regarding claims 18 and 51, Otani teaches none of the layers has a geometrical thickness of more than about 0.35λ (col. 2 lines 25-34).

Regarding claim 19, Otani teaches none of the layers has an optical thickness of more than 0.52λ (col. 2 lines 25-34).

Regarding claim 20, Otani teaches the first layer has an optical thickness in a range from 0.31λ to 0.52λ (col. 2 line 29).

Regarding claim 21, Otani teaches the use of a layer with an optical thickness less than 0.1λ (col. 2 lines 50-57). It is extremely well known in the art that one may change the ordering of the low refractive layers in a high-low alternating refractive index optical filter without altering the functionality of the optical filter. Therefore one of ordinary skill in the art would recognize that the second layer of Otani could have the optical thickness of any of the low refractive layers without altering the function of the optical filter. One would have been motivated to decrease the optical thickness of the second layer for the purpose of increasing the amount of light transmitted by the filter by limiting the amount of material the light must pass through within the filter.

Regarding claims 22 and 35, Otani teaches a low refractive material layer being the smallest in thickness in an optical filter (col. 2 lines 25-34). It is extremely well known in the art that one may change the ordering of the low refractive layers in a high-low alternating refractive index optical filter without altering the functionality of the optical filter. Therefore one of

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ordinary skill in the art would recognize that the second layer of Otani could have the optical thickness of any of the low refractive layers without altering the function of the optical filter. One would have been motivated to decrease the optical thickness of the second layer for the purpose of increasing the amount of light transmitted by the filter by limiting the amount of material the light must pass through within the filter.

Regarding claim 23, Otani teaches a high refractive material having a thickness of less than 0.12λ (col. 2 lines 50-57). It is extremely well known in the art that one may change the ordering of the high refractive layers in a high-low alternating refractive index optical filter without altering the functionality of the optical filter. Therefore one of ordinary skill in the art would recognize that the third layer of Otani could have the optical thickness of any of the high refractive layers without altering the function of the optical filter. One would have been motivated to decrease the optical thickness of the third layer for the purpose of increasing the amount of light transmitted by the filter by limiting the amount of material the light must pass through within the filter.

Regarding claims 24 and 40, Otani teaches that none of the low refractive material layers has a geometrical thickness of more than about 70nm (col. 2 lines 25-34). The largest geometrical thickness shown is 68nm.

Regarding claims 25 and 41, Otani teaches the overall geometrical thickness of the multilayer system amounts to less than 2λ (col. 2 lines 25-34). The overall thickness shown is 1.47λ .

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Regarding claims 26 and 42, Otani teaches the overall geometric thickness of the low refractive material layers is less than λ (col. 2 lines 25-34). The overall geometric thickness of the low refractive material layers is 0.76λ .

Regarding claims 27 and 43, Otani teaches the multilayer system has no more than six layers (Fig. 1).

Regarding claims 28 and 44, Otani teaches the ratio of the sum of the low refractive thickness to the high refractive thickness is less than 1.2 (col. 2 lines 25-34). The ratio shown in is 1.07.

Regarding claims 29 and 45, Otani lacks reference to the claimed performance of the optical filter however; Otani teaches the structure of the optical filter as described in the claim limitations and therefore would be able to perform any function claimed by the claim limitations.

Regarding claims 30 and 46, Otani teaches the invention as claimed but lacks reference to the incident angle and the reflectivity of the filter. Hashimoto teaches that at an incident angle of 0 degrees and a reflectance of less than 2% (Table 1 and Fig 2). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the reflectance of the Otani invention have the dependence on incident angle as taught by Hashimoto for the purpose of minimizing reflection of incident light at common incident angles.

Regarding claims 31 and 47, Otani teaches the substrate is made of fused silica or crystalline fluoride (col. 2 line 16).

Regarding claims 32 and 48, Otani teaches the filter working for a wavelength of about 248nm (col. 2 lines 14-15).

Regarding claims 33 and 49, Otani teaches the reflectance within the working wavelength range covers a bandwidth of more than 1.1 below a given reflectance, wherein the bandwidth is the ratio between the wavelengths of the long wave limit and the short wave limit of the wavelength range, in which the reflectance lies below 0.3% (Fig. 2).

Regarding claim 34, Otani teaches an optical component comprising a substrate with at least one surface; a multilayer system of at least six stacked layers arranged to the at least one surface of the substrate, each of the layers comprising a high refractive or a low refractive dielectric material (Fig. 1). Otani further teaches the use of only one high and one low refractive material (col. 2 lines 45-48). Otani teaches none of the layers has a geometrical thickness of more than about 0.35λ (col. 2 lines 25-34). Otani teaches the use of a layer with an optical thickness less than 0.1λ (col. 2 lines 50-57). Otani teaches a high refractive material having a thickness of less than 0.12λ (col. 2 lines 50-57). It is extremely well known in the art that one may change the ordering of the low or high refractive layers in a high-low alternating refractive index optical filter without altering the functionality of the optical filter. Therefore one of ordinary skill in the art would recognize that the second or third layer of Otani could have the optical thickness of any of the low or high respectively refractive layers without altering the function of the optical filter. One would have been motivated to decrease the optical thickness of the second layer for the purpose of increasing the amount of light transmitted by the filter by limiting the amount of material the light must pass through within the filter.

Response to Arguments

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Applicant's arguments with respect to claims 17-51 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Otani (US 6,396,626) teaches the use of very thin layers in optical filters.

Costich (US 5,426,532) teaches the use of a multilayer thin film filter.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L Pritchett whose telephone number is 703-305-7917.

The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on 703-305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JLP



DREW DUNN
SUPERVISORY PATENT EXAMINER